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EDITORIAL NOTES

THE PATH BEFORE US

ON Thursday last the Midland Association enjoyed an Address by the Institution President, Mr. E. V. Evans, and this informal Address, the major part of which we publish in our issue to-day, crystallized thoughts on three problems the importance of which needs no stressing from us; it obviously affects us all. Mr. Evans uses the English language with distinction, and considering his wide experience at the focal points of the Gas Industry's activities we could not imagine his giving an indifferent Address, however informal. What he had to say last Thursday was followed keenly by the meeting and there was a discussion an outline of which we shall give later. His comments—they covered in part the work of the Gas Research Board, the function of the chemist in our Industry, and certain aspects of post-war planning—will without doubt be studied in this country and should also arouse the interest of our colleagues in the American Gas Industry, many of whose views on the Industry post-war, though in the melting-pot, are markedly divergent from our own.

The views expressed by Mr. Evans tally with our own, and we would underline one or two of his considered opinions, which seem to us to call for close thought as a basis for Industry reconstruction. First we have the downright statement that at the time of the declaration of war the Gas Industry was not performing that part in the national economy of our coal resources which it rightly should perform. The Industry was not gaining ground in the sense that, while its services were covering a wider area and the number of its consumers was increasing, the consumption per consumer curve was falling. Operation of flat rate charges for gas resulted in the consumer not only being unwilling to displace raw coal by gas, but in regarding gas as a service which can be replaced by electricity. The present relationship between gas and electricity—agreement on all points in meeting wartime problems and conditions—is, of course, well known and its *raison d'être* thoroughly appreciated, but, however long drawn out, the phase is enforced and transitory. We must look beyond it and we must not be uncertain in our approach to the future. The argument advanced by Mr. Evans ran thus: The more electricity takes of the domestic heating and cooking loads, the more difficult it becomes to extend the use of gas to the large heating loads which the Gas Industry could supply to national advantage. The cost of electricity generation is such that electricity could not economically take the load that would result from displacing raw coal in the home and in the factory; moreover, when electricity is used for heating purposes, the process is wasteful in coal. Conservation of our coal resources will become imperative. If raw coal were displaced by gas for domestic purposes, a saving of 15 million tons of coal yearly would result. Gas, or gas and coke, can provide the solution—the *only* solution possible at a reasonable cost. It has been shown that when the charge for gas is made on a scientific basis the replacement of raw coal is a practical achievement. The cost of the improved service is no greater; sometimes it is actually less. The future must see scientific methods of charge.

The Gas Industry has, in fact, what we may term a cast-iron case. Special spheres of application should be allocated to gas and to electricity. We think the Gas Industry should welcome the appointment by the Government of a special commission of disinterested people to investigate the problem, and base their conclusions and recommendations on grounds of national economy and the welfare of the community.

Turning to the work of the Gas Research Board, Mr. Evans entered a caveat. He stated most emphatically at the meeting that the vast expansion of the Industry envisaged must not wait upon the work of the Gas Research Board. His words were: "The carbonizing process as practised in the latest design of plant available to-day is one of high efficiency, and such plants are eminently capable of taking up all additional loads." This statement is, we think, of special importance having regard to optimistic utterances concerning the practical application of what has come to be known as the Gas Research Board process of complete gasification—utterances which have been reviewed in these columns during the past year. Speaking as a chemist, Mr. Evans suggested the following aims in developing our methods of coal processing: Ability to deal with a much larger range of coal and not be dependent on a caking coal of low ash content; in making gas, to produce such a proportion of coke as may be sold advantageously; to produce a tar which can be readily hydrogenated to liquid fuels; to carry out the process of coal treatment in a vessel self-heated internally. The processes being examined on the laboratory scale by chemists of the Gas Research Board aim at carrying out some or all of these postulates, and Mr. Evans outlined the work involved and the new technique employed, emphasizing that a great deal has yet to be done before the work has *any practical significance* in our Industry. To the question, will the gas made by the G.R.B. process be cheaper than that of the present processes, Mr. Evans replied simply: "I hope so, but really at this stage I don't know and I might even say I don't care. It is a complete revolution from which all sorts of possibilities may arise. There will be many disappointments . . . but chemists are trying to evolve a process of coal treatment which shall be a true chemical process . . . one that may be operated by manipulation of valves and one that takes place in closed reaction vessels self-heated internally."

We come to the third aspect of the Address—the function of the chemist in our Industry, a subject which we have discussed in the "JOURNAL" very many times, more recently in connexion with the establishment of a degree course in Chemical Engineering at Leeds University, from which we feel that the Industry should benefit, for essentially gas making is a chemical engineering process. Actually, one of the speakers in the discussion at the Midland meeting put forward the view that in the future the chemist in the Industry would be of more importance than the engineer, for while to-day most of the purely engineering problems are in fact solved by the contractors of plant, the running of these plants has to be carried out by personnel of gas undertakings, and the process is a chemical one. For our part, we like to think of chemists and engineers as equals and collaborators—and by "chemists" we do not mean "testers"; there is a gulf of difference between the two. As Mr. Evans remarked, "Do not imagine that because you employ a man practised in the carrying-out of gas-works tests and in that only, you have a chemist," but he went on to say that the future of the Industry depends largely on the chemist and the physicist, adding the important proviso that he must be closely associated with the administrator of the gas undertaking, and that the administrator must possess such a comprehensive outlook that he and the chemist may talk together with understanding. It is fortunate that the training of the modern gas engineer is in the direction which will enable him to talk with understanding with the chemist. Yet to-day the number of gas undertakings without any form of chemical control is disconcerting; as an Industry we are short of control chemists of the proper type. This points to the desirability of applying chemical control on a regional basis, and to our mind there is no need to wait till the end of the war to put into operation a measure of pooled chemical resources which would be exceedingly helpful.

We headed this note "The Path Before Us." Mr. Evans reconnoitred the path helpfully, concentrating on a few of the outstanding principles which should occupy our thoughts and determine and influence our actions. Perhaps the dominant thought is contained in the following words towards the end of the Address: The Industry must look at its responsibility mainly from the viewpoint of national economy. It would seem improbable that we shall ever return to the parochial and limited outlook of the self-contained units that ruled before the war.

RUBBER

A CORRESPONDENT has asked us to say something about rubber supplies in relation to the Gas Industry. Though we cannot reply gladly, we acceed readily to his request. The rubber situation is not, of course, gratifying or pleasant to contemplate. Three-quarters of our former resources of raw rubber are, as is well enough known, in the hands of the enemy. The position of rubber supplies available to this country has become such that it is imperative that rubber be used only for vitally essential purposes, and then only when no suitable alternative is available. We are not in a position to discuss the possibilities of the supply of synthetic rubber in the future; if and when such supply becomes available in appreciable quantity, it is obvious that the Gas Industry will not expect to be placed in any priority class. We learn that the first few pounds of Russian dandelion seed, from which it is hoped to produce rubber in Australia, are now germinating. It is hoped to produce rubber from this seed experimentally in six months and commercially later. The first consignment of the seed was 10 lb.; it is hoped to get a ton later.

The Gas Industry uses a good deal of rubber, among the more special applications being conveyor and projector belts, the sealing of purifiers, and the jointing of pipes. In the national interest, even where the use of alternative material involves the user in more expense and inconvenience than does the use of rubber, the alternative material should be adopted. The Gas Industry has had many an opportunity of showing its ingenuity; it has now another enforced chance of proving its resourcefulness. The Directorate of Gas Supply has already stated the case without ambiguity. We know it is all out to help and advise undertakings.

Discussing the situation in rather more detail, where undertakings contemplate the installation of new conveyors, authority will be granted only if such installations do not involve the use of rubber. That to some extent this may be a retrogression in gas engineering practice is quite beside the point. If we have no eggs we cannot indulge in eggs and bacon. Any project still in design should be revised so as to require a minimum of rubber; wherever possible a new design should be adopted so as to avoid the use of rubber *in toto*. The Directorate has stated that there are probably no materials not in short supply which would provide a satisfactory substitute for conveyor belts, and the conveyor cannot be converted to other types except by complete rebuilding. The need for conserving belts by every possible means is there, and practical suggestions have been put forward. All plants not absolutely necessary might be shut down; the rubber, properly stored, could be earmarked as spares for other essential plant. On the other hand, a much longer belt life might be obtained if a lower standard of reliability were accepted. As a minor point, the use of vulcanized joints instead of belt fasteners should be extended. Concerning dry lute purifier covers, it is possible to make a satisfactory joint with other materials, such as greased rope. Large quantities of rubber hose are used by the Industry for anti-freezing on gasholders and compressed air and hydraulic services. Metal tubing with flexible joints presents an alternative. Trolley wires could replace electric trailing cables in many instances, it is suggested; wherever possible, rubber pipe jointings should be avoided; in certain cases it may be possible to substitute leather belting for rubber V-belt drives.

There is, we think, no need for us to enumerate the many other uses of rubber in the Gas Industry. Most are general to industry, and gas undertakings will have to follow the general arrangements made in respect of the supply and usage of articles made of or containing rubber—from pump valves and diaphragms to rubber boots and tyres. We have much faith in the resourcefulness of the Gas Industry and that of the many manufacturing firms serving it, and we are sure that the Government will receive from the Industry the closest co-operation in effecting as great a saving as possible in the use of rubber.

Personal

Mr. ALBERT ORMROD, Chief Chemist to the Oldham Gas Undertaking for the past six years, severed his connexion with the Undertaking on Sept. 4, when he took up the position of Assistant Engineer and Manager to the Oldbury Gas Undertaking. On behalf of the staff and employees, a parting gift in the form of book tokens was handed to Mr. Ormrod by Mr. Greenhalgh, the Gas Engineer, who spoke in the highest terms of Mr. Ormrod's work.

Letter to the Editor

A Gas Training College.

DEAR SIR,—I have read with interest Dr. Long's comments on my letter published in the GAS JOURNAL under the heading of "A Gas Training College."

In reply, may I state that my information regarding the work of Watson House and the Westminster Technical Insitute is certainly limited, that is so far as the detail of their organization is concerned, but, like many North country men, I hold both Dr. Long and the Metropolitan Technical Institutes in the very highest regard. The disproportionately large number of men who have been trained in those institutions in courses framed to meet the requirements of the Institution of Gas Engineers' education regulations, and their success in the examinations, is ample proof of the efficacy of the training given. The further knowledge that the proposed extensions to the Westminster Technical Institute include provision on a large scale for the training of Gas Industry personnel is indeed very satisfactory, and demonstrates quite clearly the advantage of co-operation with local education authorities.

In view of the foregoing, it will be realized that the proposals contained in my letter are neither a criticism of past achievement of evening institutes, nor in any way due to a lack of understanding as to the part they will play in vocational training schemes for the future. However, I do very seriously suggest that the need for training in the theory and practice of gas distribution, utilization, appliance maintenance, sales promotion, etc., is a matter of supreme urgency, and that a Gas Training College with residential facilities is a progressive development for the Industry.

Furthermore, on the cessation of hostilities it will be the responsibility of the Gas Industry to provide those young men who have served in the Forces, and others deprived by circumstance attendant upon the war from pursuing courses of study which they normally would have undertaken, with an opportunity to undertake training to fit them for re-entry into the Industry.

Dr. Long states in his letter, "The real problem in technical education is to secure a sufficient measure of co-operation from employers to release personnel for training in the daytime." This point is obviously the one which I had in mind when making my suggestions for a Gas Training College. Dr. Long further states, "Knowing the difficulties surrounding this problem, one wonders what the reactions of the Industry would be to the release of personnel for residence at a distant college." In answer to this I would say that, judging from the points of view which have been freely expressed by men of the highest authority and responsibility at Gas Industry meetings concerning post-war reconstruction, it would appear that no such obstacles will be placed in the way of effective training methods in the future. This attitude undoubtedly has the full support of the President of the Board of Education, whose speeches concerning the subject of education for industry coincide with this view.

The kind of competition which prevailed in the fuel industries before the war, particularly as between gas and electricity, seriously retarded rational development. Dissatisfied consumers were lost and bad installations withdrawn, and invariably competition was advanced as the reason, whereas incompetence was in many cases the real cause. After the war we visualize a scheme of economic development of the country's resources in which wasteful competition will not be permitted. Unsound installations and justifiably dissatisfied consumers will indeed be a reflection on the capacity and vision of the sales promotion and service organizations.

The Gas Industry must modernize and extend its training facilities to justify its acceptance as a national basic industry enjoying a clearly defined market.

332, Duffield Road,
Darley Abbey, Derbys.
Sept. 8, 1942.

Yours faithfully,
THOMAS SMITH.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS

THE Annual Meeting of the North British Association of Gas Managers was held in Glasgow on Sept. 4, the President, Mr. R. D. KEILLOR, Greenock, extending a welcome to a large attendance. He intimated that they had with them Mr. E. V. Evans, President of The Institution of Gas Engineers.

Sympathetic reference was made by the President to the loss sustained by the Association through the death of the following members: Messrs. John Wilson, Dundee, a former President; A. P. Dale, Beith; R. A. Harvey, Catrine; Arthur Cuthbert, Stirling; Bertram B. Waller, Stroud; Boyd C. Workman, Saltcoats; and Thomas McEwan, of R. & A. Main, Ltd., Falkirk.

Apologies were intimated from Dr. E. W. Smith, Director-General of Gas Supply, who was indisposed, and from various members and officials of kindred societies.

Mr. E. V. EVANS, O.B.E., President of the Institution, said: The Director-General of Gas Supply has stated emphatically that if the Industry will declare, with reasonable unanimity, what it considers best for its future development, he and his colleagues will do their utmost to get our requirements established. I am sure the Industry would prefer to control itself rather than be controlled from Whitehall. We have been given that chance. How foolish we shall be if we do not avail ourselves of this offer. Our problem will be to get that unanimity and to achieve real co-ordination in our Industry. This is not so easy a problem as it may seem. It will be necessary for you to elect your leaders—men in whom you will place implicit confidence—and having elected them give them a chance to lead. We are members of a great Industry essential to the nation and the community. At the time of the declaration of war we were not fulfilling our task. There were between 35 and 40 million tons of coal being burnt in the raw state by the domestic consumer. If the work had been performed by gas, a saving of at least 15 million tons of coal annually would have been made. If gas is sold in a scientific manner, with a domestic load of this magnitude the cost to the consumer would be substantially the same as if raw coal were used.

Our Industry in the past has performed an appreciable national service. Of the 12 million homes in the country, a gas supply is provided to between 9½ and 10 million. It is a conservative claim that a family changing from coal cooking to gas cooking represents a saving of 2 to 2½ tons of coal a year. And it is estimated that some 20 million tons of coal are saved yearly by the gas cookers already installed. This is no mean achievement, but there is still that immense waste of 15 million tons of coal which the Gas Industry only can save.

The heat requirements of the average house may be expressed as about 280 useful therms a year, and the Industry supplies only some 20% of this by gas and a further 5% by coke. It is the remaining 70% odd that represents the immense field open to the Gas Industry.

I am told that, particularly in Scotland, you wish to know whether the small works must disappear. I can only give my personal opinion. It does not follow that because a works is small it is inefficient. I believe that the Industry must set its standards of efficiency in manufacture, distribution, commercial working, and service to the consumer. It is not unreasonable for consumers to expect to receive the same adequate service whether they happen to be in a large town or a small town, in North or in South. This is not intended to imply that the service in large towns is necessarily better than in small towns, but there are difficulties in giving really good service on a small scale. Some undertakings, owing to the necessity to keep down administrative costs, may require help from a regional centre, but again I would say that because a works is small it does not follow that it should disappear.

In addition to the list appearing in the Annual Report, it was intimated that the following had been admitted to membership: W. S. Mackay, Oban; John Martin, Biggar; Bernard O'Donnell, Busby; Hugh Adams, Langholm; with J. J. Taylor as an extraordinary member.

Speaking on the Annual Report, Mr. DAVID FULTON, Helensburgh, drew the attention of members to the passage dealing with education. It was the duty of every man in a position to make appointments to see that new entrants to the Industry were chosen with great care and that, when chosen, they were given every possible help.

It was announced that a First-Class Certificate in Gas Engineering (Manufacture) had been gained by Mr. D. Marshall, of Kirkcaldy, and Second-Class Certificates by Messrs. S. K. Paterson, of Dunfermline, and R. J. Thomson, of Motherwell.

It was announced that Mr. R. M. Simpson, Denny, would be President for the ensuing year, with Mr. A. Jamieson, Johnstone, as Junior Vice-President. Members of Council (elected to vacancies) were Messrs. H. Robinson, Annan, and H. S. Milne, Aberdeen.

Mr. H. A. AITKEN, Buckhaven and Leven, presented Mr. Keillor with the President's medallion.

Mr. KEILLOR acknowledged the help given him by the Secretary, Council, and members.

Luncheon Speeches

Mr. R. D. Keillor occupied the chair at luncheon.

Lord TRAPRAIN, proposing the toast of "The County and City of Glasgow," said it was appropriate that he, recently appointed Coal Controller in Scotland, should undertake the task, for Glasgow owed its prosperity to coal. Glasgow's great time had commenced when the Lanarkshire coalfield was first developed. With the proper planning of coal and other industries Glasgow could look forward to prosperity beyond what she had enjoyed in the past.

Lord Provost J. M. BIGGAR, Glasgow, replying, said the enterprise of sea-faring men and merchants had laid the foundations of Glasgow. They had developed their shipbuilding and engineering to an enormous extent, and the foundation of both was coal.

Commander STEPHEN KING-HALL, M.P., Publicity Officer, Ministry of Fuel, said that the fuel target was designed to set a standard of maximum consumption which in the case of the majority of the houses of Great Britain would mean a cut of approximately 15% of their normal consumption. This he believed to be a perfectly feasible economy involving some degree of austerity but no suffering or unendurable hardship. In the case of households which had already practised austerity in fuel consumption he had seen cases in which the fuel target figures gave them a ration equal to their present consumption. But there were a certain number of persons who for a variety of reasons and special circumstances found that adherence to the target figures in their case would mean a cut of perhaps 60% on last year's figures of their consumption. It could be argued that even so great a cut as this would not involve the consumer in hardships comparable to those undergone by their Russian allies, the peoples of the occupied territories, and many thousands of men in the fighting forces. Nevertheless, the fuel situation, though serious, did not demand that degree of hardship. He therefore said, with the authority of the Minister to say it, that where a consumer who had not been extravagant in the use of fuel found that adherence to his target figure did involve him in a cut of more than 40% of his normal consumption, he should regard a 40% as his target. If he achieved this he might conscientiously consider that he had done his duty in the Battle for Fuel.

They might say: "Why should a man whose target figure gives him a cut of 60% or over be asked to cut to 40%? Why not ask him to cut to 15%?" His reply to that question was that the majority of cases in which the fuel target figures worked out to what might reasonably be called an impossibly high degree of economy were cases of houses of over seven rooms inhabited by people whose social habits gave them a greater margin in which to economize than was the case with the small man.

Commander King-Hall went on to say he could not speak too highly of the whole-hearted co-operation he had received in his task from the gas, electricity, coal, and petroleum associations. It would be his duty to issue all the information he could to assist them in their task.

The problem of the economical use of fuel in industry had been in hand for several months, and results were becoming apparent. A second point was the case of controlled establishments, such as offices and hotels and public buildings. An Order was about to be issued dealing with certain aspects of fuel economy in such places. Finally, there was the question of production. Active measures had been taken in that direction and more were in hand.

Bailie E. ROSSLYN MITCHELL, Glasgow, proposed the toast of "The Gas Industry."

Mr. E. V. EVANS, replying, said the question of post-war planning enjoyed a very mixed reception. Enthusiasm for it ebbed and flowed upon the tide of war events. Their first duty was to win the war. Having won that war, there would remain an economic war to be won. The re-establishment of the country in the economic position that it deserved to occupy would need the most able guidance by their heads of state. Two factors alone—reduced purchasing power and the dearth of transport—would compel them to utilize their own rich resources to the utmost. Their richest possession was coal. Coal burnt in the open grate was nothing short of profligate extravagance. Coal used for the generation of electricity, if that electricity was reconverted to heat, was also wastefully used. The way the Gas Industry treated coal and the products derived from it—gas, coke, benzole, tar, ammonia, and sulphur—represented in itself the highest degree of coal conservation that, with to-day's knowledge, was available. The problem confronting the Minister of Fuel and Power would be many times simpler if facilities had been afforded in the past for the Gas Industry to displace raw coal burnt in the home and in the factory. He would assure Commander King-Hall that the Industry would do everything in its power to promote the fuel economy campaign.

Mr. Evans concluded: The greater the quantity of coal passing through each gas undertaking, the greater will be our contribution to the solution of the nation's post-war economic problem. We can

make that contribution with the existing processes of coal carbonization, but we should show little constructive imagination if we believed that these processes represent our last word in development. Perhaps the most pressing of all our problems is to explore all processes of coal treatment that will permit the use of all sorts and conditions of coal rather than to confine ourselves to coking coals of low ash content. If we are largely to extend the throughput of coal on our works we should strive to increase the range of coals processed. I should not, however, like you to be left with the impression that the existing processes of gas manufacture are likely to be modified appreciably in the near future. Any extension of the Gas Industry must, for some time ahead, be made with the carbonizing processes already available, and such processes have already been developed to a high state of efficiency.

National Gas Council

A Meeting of the Central Executive Board of the Council was held on Sept. 8. The Chair was taken by Sir David Milne-Watson, Bart., LL.D., D.L.

A report was received with regard to coal supplies, and it was stated that the appointment of Regional Controllers to the eight coal-producing regions under the White Paper Scheme had now been completed. The list is as follows:

Scotland.—Lord Traprain, 53, Bothwell Street, Glasgow, C. 2.

Northumberland and Cumberland.—Mr. F. C. Temple, C.I.E., North Regional Offices, Eskvale Terrace, Newcastle-on-Tyne, 2.

Durham.—Mr. T. Hornsby, Collingwood Buildings, Newcastle-on-Tyne.

Lancashire, Cheshire, and North Wales.—Mr. Gordon McDonald, M.Sc., M.P., Arkwright House, The Parsonage, Manchester.

South and West Yorkshire.—Dr. H. S. Houldsworth, K.C., Britannia House, Wellington Street, Leeds.

Nottinghamshire, North and South Derbyshire, and Leicestershire.—Mr. F. Raymond Evershed, K.C., Commercial Chambers, Parliament Street, Nottingham.

North and South Staffordshire, Warwickshire, Cannock Chase, and Shropshire.—Alderman J. A. Webb, M.B.E., J.P., 84, Handsworth Wood Road, Birmingham, 20.

South Wales, Forest of Dean, Somerset, and Bristol.—Mr. William Jones, Royal Chambers, Park Place, Cardiff.

It was stated that an invitation had been received from the Ministry of Fuel and Power for the Board to nominate a representative to serve on the National Coal Board. It was decided to send a nomination forward accordingly.

A report was circulated suggesting that a small deputation from the Conference of Public Utility Associations, consisting of the Chairman of the Coal Committee and one representative each from the gas, water, and electricity industries respectively, should wait informally upon the Minister of Fuel and Power, to discuss the question of price-fixation machinery, questions of price and quality, and other matters appertaining to coal. Mr. A. W. Smith was unanimously appointed to represent the Gas Industry on this deputation.

It was reported that a meeting had been arranged for the following day with Sir Alan Anderson, of the Ministry of War Transport. The Board authorized the Demurrage Committee of the Conjoint Conference to negotiate on the lines set out in the report that had been circulated.

It was reported that, since the last meeting of the Board, when undertakings were advised to make application to the Ministry of Fuel and Power for permission to increase the price of gas to cover additional costs of coal and wages, it was learned that the Treasury would not accept this arrangement, and were insisting that every undertaking applying for an increase should furnish full particulars indicating the general financial position of the undertaking. It was agreed that representations should be made to the Treasury by the Committee of the Council that had been dealing with this matter.

A report from the Benzole Committee of the Council was submitted with regard to arrangements made for the price of benzole. The Board requested the Committee to continue to watch the position and to report to the Board from time to time.

It was reported that a special meeting of the Rating Committee of the Conference had been held on Aug. 25 to consider the increasing burden of local rates on attenuated mains networks, and that a report would be made with regard to the existing position at the next meeting of the Council of the Conjoint Conference with a view to formulating proposals for the amendment of the present procedure.

It was reported that a meeting of the War Damage Committee of the Council had been held on Aug. 11 to discuss which items should be included in the Public Utility War Damage Scheme in so far as it applied to the Gas Industry.

It was agreed that the retaining fee to Messrs. Ryde, Sons, & Browne should be continued.

It was unanimously decided to co-opt Mr. C. M. Croft, D.L., J.P., as a member of the Board.

The next meeting of the Board was fixed for Tuesday, Oct. 13.

Meeting of Midland Association

A Meeting of the Midland Association of Gas Engineers and Managers was held on Sept. 10 in Birmingham under the Presidency of Mr. C. F. W. Rendle, of Redditch, when Mr. E. V. Evans, O.B.E., President of The Institution of Gas Engineers and Chairman of the Council of the Gas Research Board, gave an informal Address in the course of which he dealt with the work of the Board, the function of the chemist in our Industry, and some of the problems of post-war planning. A report of the Address will be found on later pages of the "JOURNAL" to-day.

The President, having welcomed Mr. Evans and expressed the Association's pleasure at the presence of Dr. W. T. K. Braunholtz and Mr. J. F. Davis, of the South Metropolitan Gas Company, election of the following new members was reported: Messrs. F. A. Jenkins, Leamington Spa; T. E. Parry, Cannock; W. E. Plevin, Oldbury; and A. C. Willsmore, Ross-on-Wye.

Awards of Higher Grade Certificates in Gas Engineering (Supply) were announced as follows: *External*—F. B. Halliwell (Loughborough), W. C. Talbot (Cannock), T. H. Talbot (Tipton); *Internal*—C. G. S. Rolls (Birmingham).

Mr. Evans then gave his Address, which was followed by a discussion, our report of which will appear subsequently in the "JOURNAL."

50 Million Pennies Locked Up

Over 50 million pennies that might be in circulation are locked up in gas meters for weeks at a time, said Mr. A. E. Sylvester, of the Gas Light and Coke Company, last Monday. If housewives with two-coin meters would put 1s. in their slots instead of 12 pennies they would get exactly the same amount of gas, and they would not only relieve the present shortage of copper, but would help to release men for war work. A number of women are already acting as meter collectors and more would do the work if the loads could be made lighter. Many highly suitable women are prevented from taking up the work because they are not physically strong enough to carry heavy bags of copper. A man can hoist about 75 lb. weight in pennies on his shoulder, but no woman, Mr. Sylvester went on, would be allowed to carry so much even if she were willing.

£5 worth of shillings weighs exactly the same as 5s. worth of pennies. That is to say, housewives who put pennies in the slot when they might use shillings are making other women's work 20 times as heavy as it need be. £5 in pennies weighs nearly 25 lb. in weight.

There are well over half-a-million 2-coin gas meters in the Company's area alone. Here, therefore, is a real war job that housewives can do at the expense of a little thought.

The need to enlist the help of housewives in this matter is so urgent that the Gas Light and Coke Company has installed a window display dealing with the subject in 50 of its showrooms.

Meetings of the B.C.G.A. Publicity Sub-Committee and of the full Executive Committee will be held on Sept. 22 at 11 o'clock and noon at Gas Industry House.

A Meeting of the Yorkshire Junior Gas Association will be held on Oct. 3, at the Great Northern Hotel, Leeds, when Mr. F. Beaumont, Huddersfield, will give his Presidential Address.

A Meeting of the London and Southern District Junior Gas Association will be held at Westminster Technical Institute, S.W. 1, on Sept. 25, when Mr. L. W. Andrew will give a Paper entitled "No Complaints from the District."

The Newcastle Gas Company, in co-operation with the electricity undertakings serving the area, is publishing a series of advertisements appearing each week in the morning and evening newspapers of Tyneside and district, urging the need for fuel economy. This publicity is being backed up by special showroom effort, and simple forms have been issued by the Company to assist consumers in fuel economy and assessing the fuel target requirements.

A Warning that unless they economize in the use of gas the Corporation might be compelled to reduce pressure on certain days has been issued to Kirkcaldy people by their Gas Engineer, Mr. James M. Dow, who maintains that the town is using far too much gas, despite the Government's appeal for economy. The Government campaign has had the effect of stampeding people into saving every available pound of coal and of calling on the gas supply to fill the gap. The Gas Undertaking could not get the coal to meet such a phenomenal increase, and unless there was a steadying-up the demand could not be met.

The Building Centre has, by arrangement with the Royal Institute of British Architects, taken over the Maddox Galleries, which were formerly part of the old building of the R.I.B.A. Exhibits have been transferred from the temporary premises occupied in the Polytechnic Extension and are being added to considerably by manufacturers. The Building Centre will work in collaboration with the Ministry of Works and Planning, the Building Research Station, and other official organizations, and will maintain an exhibition of materials and equipment as heretofore, but with a special bias towards present and post-war needs. A gallery is being reserved for Lectures and temporary exhibitions of national importance to be arranged from time to time. The address is: 23, Maddox Street, W. 1, where enquiries may be made by call, letter, or telephone (Mayfair 2128–9).

THE GAS INDUSTRY OF THE FUTURE.—6.

CONSTRUCTIVE SUGGESTIONS FROM WITHIN

The Gas Industry has a great future, but it is generally agreed that it must face radical changes; that it must form opinion within its ranks; and that it must work out its own salvation or accept the consequences of neglect. In the last five issues the "JOURNAL" has made an effort impartially to review some of the principal schemes of rationalization in other industries in order to help the Industry to decide which way it wants to go. In this concluding article we sum up the progress so far made towards co-ordination, and summarize some of the constructive suggestions that have been made within the Industry.

EARLIER articles have reviewed what has been done in other public utility services by way of "socialization," co-ordination, and regionalization. While these processes have been developing the Gas Industry has not stood still, and it only now remains to see what it has achieved and what constructive proposals have been put forward from within the Industry for future action. As P. Chantler pointed out in *The British Gas Industry* in 1938, "the outstanding characteristic of the economic development of the Gas Industry since 1920 has perhaps been neither expansion nor stability, but consolidation. Integration of the gas and coke oven industries has begun; bulk supplies are being given and taken on an increasing scale; regional grids are being introduced; amalgamation has been going steadily forward among the companies, and to a lesser extent among local authority undertakings; co-operative schemes for by-product marketing have come into being; and recent years have witnessed a rapid expansion of the holding company movement." There is no need to enlarge on all these trends, but a few landmarks are worth noting; the Sheffield grid for instance. Besides absorbing several smaller undertakings in the area, the Sheffield Gas Company is operating an extensive network of high-pressure mains connecting coke ovens, industrial plants, and gas-works, on the basis of the Area Gas Supply Committee Report, 1930, distributing low price gas to industry either directly from the grid or through its own distribution system, and providing bulk supplies for neighbouring undertakings. In the same county the West Yorkshire Gas Distribution Company, the first undertaking of its kind in the country authorized to buy gas from coke ovens and gas undertakings and distribute and sell to gas undertakings only which are connected to the system, is operating the West Yorkshire grid very satisfactorily.

A grouping arrangement more in line with the commonly accepted idea of rationalization is that at Swindon, where seven or eight small outlying undertakings have been acquired by the Swindon Company and linked up by high-pressure ring main. The local undertakings retain their separate identities in name, but uneconomic carbonizing plant has been closed down and local works have become distributing points. Rural areas on the line of the mains which might never have been reached by the individual companies are enjoying a supply of gas as a result. A similar scheme was adopted at Harrogate some years ago, but in that case the seven acquired undertakings lost their separate names. Scores of successful amalgamations could be quoted to refute the challenge that the Industry has done absolutely nothing, but these examples will suffice. The holding company movement has brought something like 250 undertakings under the control of less than 20 holding companies, though not all of them are grouped from a geographical standpoint. Even where undertakings are widely separated it is claimed that there is the advantage of central technical direction, but a disadvantage of the movement is that where it does not follow a regional plan it may impede other efforts in that direction.

Further afield, some lessons might be drawn from the long-distance transmission of natural gas in the United States, and from the great coke oven gas networks in Germany. Sixteen years ago the German gas-works were producing less than half as much gas as those of Great Britain, and consumption per head was 1,800 cu.ft. per annum against our 6,000 cu.ft. As early as 1913, however, there were 250 miles of main used for the delivery of coke oven gas over 460 sq. miles, and in 1926 the Ruhr industrialists embarked on rationalization and planned a grid to deliver coke oven gas over distances up to 310 miles, thus competing with gas-works gas at Keil, Dresden, Berlin, Munich, and Stuttgart. The scheme was opposed by the Gas Industry, which feared a monopoly from the Ruhr heavy industries, and by the railway companies, which regarded it as a menace to their coal traffic, and the proposals were modified so as not to interfere with existing gas-works that were producing gas economically, and distribution was left to separate companies and authorities. By 1930 the network completed and contemplated by the Ruhr Gas A.G. covered 600 miles, in addition to which there was the extensive grid of the Thyssen Gas and Waterworks Co., and about a third of all the gas consumed in Germany came from the Ruhr coke ovens.

Area Supply Schemes

The alternatives before the British Gas Industry to-day, as summed up by one of the speakers in last year's Institution discussion, are (1) voluntary sinking of sectional and personal interest in a determination o construct from within a really united industry with far-reaching central control, and (2) formation of a national Industry by compulsion from without. The need for voluntary steps towards consolidation and regional operation has been stressed in almost every presidential address in the last year or two, but few people have attempted to produce any constructive plan for its fulfilment. The tendency has been to leave it to the national bodies to "get together," to appoint committees and so forth, rather than get down to detail and suggest just how to proceed. The field for studying concrete proposals is therefore somewhat limited.

The Departmental Committee on Area Gas Supply, on whose 1930 report the Sheffield grid was based, investigated the technical and economic aspects of an area gas supply system for the region embracing Lancashire, Yorkshire (East and West Ridings), Cheshire, Derbyshire, Nottingham, Lincoln, Staffordshire, Leicester, and Warwick. It was concerned primarily with the utilization of coke oven gas, and it did not attempt to estimate to what extent it was possible or desirable that gas undertakings should co-operate by absorption or linking up towards the establishment of a gas network, but it opined that grids such as that subsequently installed at Sheffield would in time tend to a co-ordination of the undertakings whose areas of supply were covered by them. Creation of one comprehensive network for the 14,300 sq. miles of territory examined was dismissed as too ambitious, and when the Committee studied three districts in detail it found economic justification for a network in South Yorkshire only. Conditions were not then favourable for a network either in Lancashire or in West Yorkshire, although, as already mentioned, the West Yorkshire Gas Distribution Company has since established one in the latter area. There was divergence of opinion on the question of ownership of gas grids. The South Yorkshire coke oven owners urged that they should own any grid in that area; the National Gas Council thought the authorized gas undertakings should own it; and there was an alternative proposal to which the Committee had no objection in principle, that networks should belong to companies representing both sides. The Committee was unable to submit a unanimous recommendation concerning the Sheffield grid, the members being almost equally divided between two opinions, (1) that it should be owned by an existing gas undertaking, preferably the Sheffield Gas Company, and (2) that there was no reason why the general principle of joint ownership between gas and coke oven interests should not apply there as elsewhere. There was much opposition to the Sheffield Gas Company Bill arising from the division of opinion on ownership, but the Bill was passed and the scheme has been a big success.

P.E.P. Report

The P.E.P. report on the Gas Industry in Great Britain, issued in 1939, declared that national initiative was necessary to formulate and guide a scheme for re-organization and to define the regions so important in operation. The initiative must come from the centre. A national body would formulate general geographical, technical and commercial principles of policy, and stimulate progress on the lines laid down. Within this framework the maximum of responsibility would be left to regional groups, as the operating units; contact with the consumer would remain with the smaller local unit within the group. The Industry itself should be responsible for formulating a scheme, and for this purpose a national body should represent both the supply industry and the makers of plant and appliances. It was suggested in the report that the central body should be called the National Gas Authority, and that it should (1) promote the grouping of undertakings within gas supply regions defined by means of an initial survey, which might be carried out by regional commissions; (2) promote through the regional groups the rationalization of production and co-ordination of technical policy; (3) supervise nationally the marketing of coke and co-ordinate and extend national policies with regard to the marketing of other by-products; (4) guide the general lines of commercial policy in the Industry as a whole; (5) collect information and give advice on economic problems affecting the Industry; (6) be responsible for the public relations of the Industry; and (7) put forward schemes for recruitment and training of personnel. One of the most important tasks of the National Gas Authority would be to stimulate the grouping of undertakings by amalgamation, holding company control, joint management, "mixed undertakings," and gas boards. Joint management might in some cases be a useful method of co-ordinating two or more municipal undertakings. "Mixed undertaking" was defined as a new company to which a

municipal and a company undertaking are transferred, with representation on the board in proportion to capital contributed. The Gas Board would be formed on the analogy of some other public utilities, such as the London Passenger Transport Board. With undertakings gradually combined into regional groups, the regional co-ordination of commercial policy would follow.

In its working shape, the re-organization of the Industry as suggested by P.E.P. would involve: (1) The small local unit, either a separate undertaking or a branch, whose main responsibility would be for local contact with consumers; (2) the regional group, which might be either a co-operative body or an amalgamation, planning production for the region as a whole, arranging where necessary for bulk supply and the extension and closing of works, providing common services of a technical or specialized nature, and directing marketing and bulk purchases of appliances within the region; (3) the National Gas Authority, supervising and co-ordinating the operation of regional groups, providing certain central services, and conducting the relations of the Industry with the public in general, the State, and other industries; (4) Gas Commissioners administering the system of ultimate control in the interests of the consumer, under Parliamentary supervision.

The "Robinson" Scheme

Among the comparatively few definite proposals for regionalization that have come from within the Industry, the most far reaching is that which was broadly outlined by Mr. F. H. Robinson, Bishop's Stortford, in his Presidential Address to the Eastern Counties Gas Managers' Association earlier this year ("JOURNAL," May 27, p. 322). Mr. Robinson exhibited two maps of England and Wales, on one of which he marked the central administrative offices of the holding companies and drew lines to their respective undertakings, crossing each other all over the country in a hopelessly tangled skein. On the other (reproduced in the "JOURNAL," June 3, p. 366) he showed how the Industry could be administered in 24 regions, each containing groups of undertakings under the control of a central regional office easy of access. He pointed out that co-ordination and common policy for the district would then be possible instead of each little urban council or local board of directors working on independent lines, with neighbouring undertakings probably pulling different ways. With such regional grouping local interest could be preserved, while the official on the spot would feel he had the backing of a concern with ample technical and financial resources to help him with any problem he had to face.

The regional scheme contemplated is one that would require legislation and would inevitably create heartburning among some of the smallest undertakings, which in general have yet to realize that service to the community means the sinking of personal preferences. Small local companies and urban council gas committees would cease to exist as separate entities, and the entire Industry would be administered on a regional basis, with central direction, and ownership in the several regions would be in the hands of something in the nature of a public corporation. There would be 24 regions, and each region would have a central administrative office, preferably at the headquarters of the largest existing undertaking in the region; a number of area administrative offices which would in practice be the headquarters of the existing medium sized undertakings in the area with an output above a certain figure; and a larger number of local offices corresponding to the present smaller separate undertakings. At the head of the Industry there would be a Central Gas Board, comprising the heads of each of the 24 regions, to deal with national policy and regulation. Regional Gas Boards, with an independent chairman and one member —a resident director—from each of the areas would be responsible for the entire working of the Industry in their respective regions. Each region would have a general manager at the head of its staff, and under him would be the secretary, chief engineer, chief distribution engineer, commercial and sales manager, chief chemist, estate surveyor, law officer, and staff officer. With the exception of the last three, who would be able to cope with the work of the region without assistant officers, each of these chief officials would have the oversight of assistant or district officers specializing in accounts, advertising, transport, stores, and so forth. The obvious advantage would be that the humblest of the stations in the region would have ready access to the assistance of the most expert officers. From the Gas Industry's point of view it would be immaterial whether the local stations retained their identity, but if local interest demanded the retention of local names there would be no objection. Re-organization would follow these general lines:

Finance.—Policy would be determined at regional headquarters; accounts prepared at area offices for all local depots under their control; payments would be made at local offices and, in certain remote villages and towns, into banks by arrangement; day books would be kept at local offices and particulars sent up to area offices for invoicing.

Stores.—Central stores for each regional and area office, to cover ocal offices under their respective control; local stocks kept at each ocal office sufficient for ordinary requirements; buying to be done by each area office subject to a policy determined by regional headquarters as to quantity and specification; local offices to have power to buy up to a certain figure for small day-to-day needs.

Transport.—Distribution transport to be arranged to suit local and area requirements.

Manufacture and Distribution.—To be centralized in suitable localities having regard to distances from areas supplied, and small works closed down wherever possible, the localities being supplied by high pressure into holders; villages *en route* or near to be supplied through high-pressure governors feeding into local mains or holder as necessary.

Development.—Controlled from national headquarters as regards policy, but carried out by regions and areas where suitable after submission to headquarters and approval by chief technical officers.

The closing down of small works by re-grouping does not necessarily involve reduction of personnel, but only change of responsibility. Experience has shown that men who might have been thought to be redundant have been absorbed into the larger scheme of operations and increased areas of distribution. In any case many of the older men would retire on pension, and this difficulty would solve itself in a very few years.

I.G.E. 1941 Symposium

Brief mention should be made of the Papers by Col. W. M. Carr and Dr. G. E. Foxwell at last year's meeting of The Institution of Gas Engineers. Colonel Carr reviewed holding companies, amalgamations, and the West Yorkshire grid as three main lines for co-ordination, and said that distribution companies were a cheap and efficient method of effecting grouping in an easier way than by actual amalgamation. Municipal undertakers supplying gas to or taking from such a company could be represented by members appointed to the board of the company. This is not a new suggestion, and in the case of one amalgamation of a publicly owned gas board serving two municipal boroughs and one urban district, and a neighbouring gas company also serving a borough and an urban district, the constitution of the amalgamated undertaking provided for the representation of the local authorities on the board of directors. In Colonel Carr's opinion, interests are so diverse that they could only be brought into line if a national scheme were prepared under the aegis of an appropriate Government Department. Such a scheme would envisage the appointment of commissioners to hold regional inquiries and formulate plans for definite regional groups. Such groups need not necessarily provide for the linking up of undertakings by high-pressure systems. Grouping might equally well be effected by holding companies which could be made statutory, by co-operative bodies such as joint boards providing common services of a technical and other specialized nature, and co-ordinating commercial and sales policy in the group, or by a combination of these methods.

Dr. Foxwell, who dealt with the problem from the point of view of the inter-co-ordination of the carbonizing industries, favoured the development of grid systems, and suggested that if financial difficulties prevented the industries from carrying out such a scheme it might be sponsored by the Government. Great public works, primarily of a civil engineering nature, would be undertaken to provide employment for the difficult period after the war, and the provision of trunk mains might well rank among those schemes in its value to the nation. In districts not served by grids there should be arrangements which would prevent gas undertakings from building new carbonizing plant while a neighbouring existing coke oven plant had surplus gas to sell.

Gas Commissioners

The need for Gas Commissioners was noted as long ago as 1938 by P. Chantler (*The British Gas Industry*). "The extent to which co-ordination can proceed is limited," he wrote. "To overcome vested interests and sheer inertia, the creation of some planning and directing authority for gas supply is required. A small body of Gas Commissioners, appointed by the Board of Trade, from the most competent men available, and given adequate powers and resources to secure area co-ordination would seem to be the appropriate authority. Under their supervision, integration and co-ordination might be achieved by means of amalgamations, joint boards, or the creation of area gas supply corporations of a public nature. A small number of area gas supply authorities, supervised by the Gas Commissioners, should be able to secure operating economies, and meet competition more effectively than the Industry can with its present atomistic organization. . . . The institution of some gas rate tribunal . . . seems desirable. If Gas Commissioners were established for promoting and controlling gas supply in Great Britain, authority over prices chargeable would be vested in this body, but a right of appeal against its decisions to some independent tribunal would be desirable."

Another recent useful contribution was that of Mr. R. Cowie in his Presidential Address to the Waverley Association. His suggestions for the future control of the Industry comprised a new National Gas Authority, with Regional Development Boards. The National Gas Authority indicated would embrace The Institution of Gas Engineers, a new Gas Industry Commercial Development Association, the Society of British Gas Industries, and the National Gas Council, and it would form the only channel through which contact might be made with the appropriate Government Department. It might be made compulsory for all gas undertakings to become members of the national organization. As regards the Regional Development Boards, Mr. Cowie visualized each region with its own "Gas Industry House" under the care of a capable full time organizer and publicist. The regional boards would deal with regional marketing and publicity,

planning for development of bulk supply, training of personnel, consulting engineers department and central drawing office, consulting chemists and central laboratory, and organization of salesmen's meetings and Women's Gas Council activities. Regionalization on these lines would preserve the independence and initiative of individual undertakings, and put no obstacle in the way of amalgamation or closer working where desirable.

As was remarked in the opening article of this study, probably no single scheme, either accomplished or proposed within the Industry, or adopted by any of the other public utilities, offers a complete and generally acceptable model for the Gas Industry of the future. It is, however, equally true that every one of them possesses some feature, either major or minor, that is worthy of consideration or, perhaps, adaptation, and if this survey contributes anything to the general pool of ideas it will not have been in vain. Acknowledgment must be made of the helpfulness of leaders of all the kindred public services in supplying the statistical and other information on which the notes have been based. In every instance a readiness to co-operate in presenting a composite picture of co-ordinated industry was accompanied by high appreciation of the Gas Industry as an efficiently administered public service, and an admission that others in turn had something to learn from it.

[In response to many requests, this series of articles, now concluded, will be reprinted in brochure form, and a limited number of copies will shortly be available at 1/- each, post free. To enable us to gauge the demand as accurately as possible, and to avoid disappointment, orders should be dispatched to us this week at the latest. In present circumstances we are unable to print a large surplus to satisfy unspecified requirements.]

THE INDUSTRY, THE GAS RESEARCH BOARD, THE CHEMIST

ADDRESS BY INSTITUTION PRESIDENT

IN the course of an informal Address to the Midland Association of Gas Engineers and Managers at a meeting in Birmingham on Sept. 10, **Mr. E. Evans**, O.B.E., President of The Institution of Gas Engineers, said:

A Warning: A Solution

The Gas Industry, as seen at the time of the declaration of war, was *not* performing that part in the national economy of our coal resources which it rightly should perform. I would go further and say, our Industry was not gaining ground. This is a serious statement to make. I speak as an individual, and am not expressing the considered views of one of the National Bodies.

If you study a curve of pre-war days representing the number of gas consumers in the United Kingdom, you will find a definite and healthy increase. This shows that the Industry fulfilled its responsibility to the community as a public utility service. Now study the curve of total gas supplied to consumers, and you will find that while an increase can be claimed, the curve tends to level out in recent years. This is a matter that should be viewed with concern.

It follows from these curves that our consumption per consumer is a falling one. Our main business in the domestic field is becoming the cooking load. Now the major part of the cost of gas used for cooking is the cost of making the supply available, and if the supply is little used the cost of gas must be high. Later we shall see how necessary it is to induce the consumer to take larger quantities of gas, but for the moment let us consider what we mean by the phrase "making the supply available."

Each consumer availing himself of our service should pay his contribution towards the initial cost of mains and services connecting him to our manufacturing works as well as a proportion of the costs required to afford the supply of gas, the cost of maintenance, the cost of showrooms, and of other matters. But once this cost is met by the consumer he should be allowed to enjoy the supply of a really cheap gas. With each flat rate price of gas there is a datum line of consumption per consumer when the consumer is really paying his way. Below this consumption the consumer is an unremunerative one. Above it he is being handicapped and charged at a price which makes it difficult for us to induce him to avail himself of the comforts and other amenities we can provide.

The selling of gas at a flat rate has resulted in causing the "would be" large consumer to pay for more service than he is actually using, and not only has he been unwilling to displace raw coal by gas but, what is more serious, has come to regard gas as a service that can be replaced by electricity.

The erection of electricity generating plant is a costly matter. And the process is wasteful in coal—when electricity is used for heating purposes. The electrician has taken a small proportion of the cooking and heating loads, and it must be realized that the more that is taken the more difficult does it become to extend the use of gas to the large heating loads that we can supply so advantageously. This is because the more electricity is used for heating, the greater becomes the number of our unremunerative consumers and the greater becomes the number of our consumers who find gas too costly to justify its increased use.

By a study of the capital cost of erecting electricity generating stations and of the nature of the load that is remunerative to the electrician, I do not think electricity can take the whole of the cooking load, let alone the water-heating load. Most definitely electricity could not take the load that would result from displacing raw coal in the home and in the factory.

Herein lies our supreme opportunity. Not only must we extend as much as possible our cooking and water-heating load, but our development in the domain of space heating must aim at the displacement of raw coal. It is a national service which we should undertake. The domestic consumer uses from 35–40 million tons of raw coal per annum, and it is calculated that if this raw coal were replaced by gas a saving of 15 million tons yearly would result. The conservation of our coal resources, important though it may have been in the past, will become imperative in the future. Also, the displacement of raw coal means a cleaner atmosphere, cleaner houses and cities, and a saving of labour.

Gas alone, or gas and coke together, forms the *only* solution possible at a reasonable cost.

There must exist, however, a system of selling gas that will encourage the consumer to use gas abundantly. Competitors will find it much more difficult to displace gas for heating when our consumers have qualified for a low price gas.

Now it has actually been shown by practical application to houses and flats of various types and in several parts of the country that when the charge for gas is made on a scientific basis the replacement of raw coal is a practical achievement. The cost of the improved service, whether it be all gas or gas and coke, is no dearer, and is sometimes actually cheaper than if raw coal were used.

May I again say that the levelling off of that output curve in recent years is a matter that should be viewed with concern, and add that there is a large body of men in the Industry who believe that they can tip it up. It must either be tipped up or it will begin to fall and we must not associate ourselves with falling curves.

The Gas Research Board

The development of the Gas Research Board has been—as indeed it should be—greatly retarded by the war. It is the policy of the Board to investigate all matters likely to lead to the development and improvement in the process of treating coal and its products, as well as to study the principles upon which are based the design of appliances for the utilization of gas.

The Board feel it to be their duty to explore all processes that may help in the future development of the Industry, it being assumed that the Industry will expand along the lines I have already indicated. That is to say—that our Industry will gradually be successful in taking over a very large proportion of that load which to-day requires 35 to 40 million tons of raw coal to satisfy. This would mean a large expansion of our manufacturing works.

Here I must enter a caveat and state that the expansion of the Industry must not wait upon the work of the Gas Research Board. The carbonizing process as practised in the latest design of plant available to-day is one of high efficiency, and such plants are eminently capable of taking up all additional loads.

A "True Chemical Process"

If you asked me what should be our aims in developing our methods of processing coal so as to facilitate the expansion of our Industry, I would say:

(1) To be able to deal with a much larger range of coal and not be dependent upon a caking coal of low ash content.
(2) In making gas to produce such a proportion of coke as may be sold advantageously.
(3) To produce a tar that can be readily hydrogenated to liquid fuels required for internal combustion engines.
(4) To carry out the process of coal treatment in a vessel self-heated internally, thus avoiding external heating with its low efficiency and the production of waste products of combustion.

Now the processes being examined on the laboratory scale by chemists of the Gas Research Board aim at carrying out some or all of these postulates.

It has been found that if hydrogen under pressure be passed through a bed of coal in which carbonization has just started, a reaction commences between the hydrogen and the coal substance undergoing decomposition whereby methane is produced. Heat is evolved in

this reaction, and it may be said that the coal is burning in hydrogen to produce methane. The heat evolved carries on the process of decomposing coal, and thus the process is self-supporting.

Thus, in the same way that the combustion of carbon in oxygen gives carbon dioxide as the end product, so does the combustion of carbon in hydrogen give methane as the end product, and the Gas Industry can put methane to very good use. The amount of heat evolved per lb. of carbon when hydrogen is converted to methane is about one-fifth of that produced when that carbon is burnt in air or oxygen. The methane reaction therefore has to be controlled. There are known methods of controlling the reaction, and, further, if the temperature mounts too high the reaction slows down and eventually stops. But it is a new technique, and the work of taking the laboratory conditions to the next stage of an exploratory small scale plant will be conducted by chemists well aware of the characteristics of the reaction. Arrangements for the erection of such an exploratory plant have already been made.

In the laboratory it has been shown that a very wide variety of coals will respond to this treatment.

While it is possible to convert the whole of the carbon of the coal to methane it is unlikely that we should wish to do this, and so far as can be seen at present it appears that if about half the coal can be converted to methane and a primary tar suitable for hydrogenation, the remaining half, which is less easy to treat with hydrogen, may be caused to react with steam so as to produce the hydrogen required in the first stage of the process.

Now the reaction between carbon and steam absorbs heat, and this heat, as you well know, may be supplied externally as in a continuous vertical retort, or by interrupting the process to burn a portion of the carbon in air, as in the water gas generator.

It is proposed to add a proportion of oxygen with the steam so that the necessary heat is liberated internally where it is required. Such a producer is known to chemical engineers.

So you see, the preparation of oxygen is part of the scheme, and our chemists at Leeds University, who are ingenious people, possess ideas which should allow of producing oxygen even more cheaply than is the practice to-day, by taking advantage of the high pressure of the gases leaving the methane reaction vessel. By expanding the gas down to reasonable distribution pressures it should be possible to obtain a large degree of refrigeration, probably more than sufficient to supply the oxygen required.

You will see from all this that a great deal has yet to be done before the work has any practical significance in our Industry. You may well ask me, "Will the gas made by this process be cheaper than that of the present processes?" I hope so, but really at this stage I don't know and I might even say I don't care. It is a complete revolution from which all sorts of possibilities may arise. There will be many disappointments—they have already been encountered. But chemists are trying to evolve a process of coal treatment which shall be a *true chemical process*, comparable to the synthesis of ammonia by the Haber process or the hydrogenation of creosote or the hydrogenation of coal by the Bergius process; one that may be operated by the manipulation of valves and one that takes place in closed reaction vessels self-heated internally.

While this is one line of investigation, the chemists of the Gas Research Board have been collaborating with chemists of the Fuel Research Board upon the synthesis of methane from hydrogen-carbon monoxide mixtures in the presence of a catalyst. Many have attempted to develop this reaction successfully to the large scale—a reaction the kinetics of which were worked out by Sabatier. The catalyst is a delicate affair which for a variety of reasons can easily lose its activity. I believe that the work that has been done in the last two or three years by these chemists in collaboration has led us appreciably nearer a solution, though not yet to one. As one of the causes of the loss of activity of the catalyst is the presence of sulphur compounds in the reacting gases, the chemists have made an extensive investigation into the problem of their removal from water gas and from coal gas. It is hoped that the information acquired will lead to a simplified method of removing sulphur compounds from our normal coal gas.

Sulphur Removal Essential

The Industry, as an after-war problem, must take in hand seriously the removal of sulphur compounds from coal gas. The extraction effected by benzole extraction plants is, by many of us, considered to be insufficient. A Committee of The Institution of Gas Engineers, under the Chairmanship of Dr. Hollings, has recommended that the sulphur content of gas should be reduced to 10 grains per 100 cu.ft. (which is substantially obtainable by special benzole extraction plant), and that as soon as possible the sulphur content of gas should be reduced to 3 grains per 100 cu.ft.

It is now more than 30 years since, as a young chemist, I was instructed to devise a process for the removal of sulphur compounds from gas which should displace the almost unmanageable sulphided-lime process then available. A catalytic process was evolved and was operated for many years. To-day, however, the process does little more than adorn text-books on the principles of gas manufacture, for the process has been simplified by other workers. That process reduced the sulphur compounds to some 10 grains per 100 cu.ft. and was incapable of doing much better than this, as the remaining sulphur compounds consisted mainly of thiophene, which is not decomposed by the nickel catalyst. The advantage of the benzole extraction process is that it does remove thiophene, and thus a catalytic process operated in conjunction with benzole extraction will allow of reducing the total sulphur compounds to from 2–4 grains.

Not only do I believe it will be found necessary to reduce the sulphur compounds to this low figure, but it is probable that the cost of the process will be recovered by the reduction in the cost of maintaining consumers' appliances.

Believing that the Gas Industry should be in touch with modern developments in the domain of the liquefaction of gases, arrangements have been made to collaborate with the chemists of the Imperial College at South Kensington, and a chemist of the Board is working there. It is considered that the technique of this process should be understood by the Gas Industry, which may require its application as an adjunct to coal processing in closed vessels, or even for the purification of coal gas. The following suggestion has been made and is receiving consideration:

A gas-works, during the months of small gas output, might produce a gas of high calorific value by reducing steaming in the retort. The gas would be reduced to the normal declared calorific value by the removal of methane by liquefaction. Such methane would serve later for enriching water gas when the higher gas load was demanded. Liquid methane boils at — 161°C., and the insulated storage tanks would have to be connected to the gas stream to avoid loss which might result from the small quantity which evaporates on storage.

Before leaving this cursory glance at technical matters, I want you to understand that the Board cannot make the progress that it wishes to make. A far more serious problem is before the nation, and if the services of the few chemists at present engaged were required for more urgent work, their energies would be diverted immediately to that work.

Function of the Chemist

Do not imagine that because you employ a man practised in the carrying-out of gas-works tests *and in that only*, you have a chemist. There must be testers on a works as there are tracers in a drawing office, and they both carry out worthy and necessary tasks. The training of a chemist, however, is a long and arduous process, and the finished product, if given scope, can do work as important as that of the engineer. I would go further and say the future of the Industry depends largely upon the chemist and the physicist. But he must be closely associated with the administrator of the gas undertaking, and that administrator must possess such a comprehensive outlook that he and the chemist may talk together with understanding.

Not every undertaking can afford to employ a chemist, and this is another step in the case for regionalization.

Let me say a word to the chemist in our Industry. The Gas Industry is a great achievement, worthy of the respect of every chemist, and the majority of gas engineers are masters of their job and possess wide experience and responsibilities. You must first become intimately acquainted with the processes of gas manufacture practised by your own undertaking and elsewhere, and then you must learn to present your ideas in a manner that engineers and managers can understand. The development of industrial processes is a matter of collaboration between the engineer and chemist, and the understanding between them must be such that they can work together intimately. The training of the modern gas engineer to-day is all in the direction which will allow him to talk with understanding with the chemist.

I have complete confidence in the Industry being able to adjust itself to the requirements of the future. Perhaps the outstanding change will be that the Industry must look at its responsibility mainly from the viewpoint of national economy. It would seem improbable that we shall ever return to the parochial and limited outlook of the self-contained units that ruled before the war.

The extension of supply to a rural district, or the giving of assistance by one undertaking to another, or the pooling of resources—financial or otherwise—will be regarded in a different light.

Our responsibility to the nation and to the community is to provide gas or gas and coke in abundant supply and at a low cost, supported by an efficient consumer service. This is the justification of our existence, and the more we fulfil our national responsibility the greater will become our security, and financial reward will, I believe, follow automatically.

The Merseyside Industrial Canteen Association met at Radiant House (Liverpool Gas Company Headquarters) on Sept. 7 to hear Dr. D. A. Winter, of Radiation Ltd., on "Industrial Canteen Planning in Wartime." Mr. Hopkinson, of the Gas Company, was Chairman, and the Paper was followed by a very interesting discussion.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Gas Products Prices

The London Market Sept. 14.

The only change in the prices of Coal Tar Products in the London Market refers to 95/160 Solvent Naphtha, which is now about 2s. 3d. to 2s. 7d. per gallon.

The Provinces Sept. 14.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 1s. to 1s. 4d. according to quality. Solvent naphtha, naked, North, 2s. 2d. to 2s. 6d. Heavy naphtha, North, 1s. 10d. to 1s. 11d. Carbolic acid, 60's, controlled by the Coal Tar Acids Prices (Inland) Order, 1942, operative from May 1. Naphthalene, controlled by the Naphthalene prices (Inland) Order, 1942, dated April 15, 1942, and operative from May 1, 1942, £19 to £19 10s.—bags free. Anthracene, controlled by the Anthracene Prices (Inland) Order, 1942, operative from May 1. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5½d; timber preservation and other purposes 4½d. to 6d. These prices apply as from May 13.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Sept. 12.

Deliveries are proceeding rapidly. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6½d. to 7d. per gallon; all *ex* Works in bulk. Cresylic acid is in good call at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha 6½d. to 7d. Solvent naphtha: 90/160 grade, 2s. to 2s. 3d. and 90/190 Heavy Naphtha, 1s. 9d. to 2s. per gallon. Pyridine: 90/160 grade, 13s. and 901/40 grade, 15s. per gallon.

Gas Stocks and Shares

Stock Markets were generally firmer last week, especially after Mr. Churchill's speech. Short-dated British Funds were in strong demand and home rails, shipping, and oil shares strengthened. The position was also reflected in the Gas Market, where business was heavier and more issues were marked up than for some time past, including a number of "ordinaries." A glance through the list of recorded transactions during the week shows that several stocks changed hands at and even above the top price although the quotations remained unaltered. It will be noticed in the Supplementary List that a sharp rise of 8 points occurred in Slough 5% debenture. This is the first time that any business has been recorded in this stock for over two years, and illustrates how difficult it is to obtain some of the fixed-interest stocks and the consequent appreciation in value when a parcel becomes available.

The following price changes occurred during the week:

PROVINCIAL EXCHANGES

Hartlepool Ord. (x.d.)	71—73	Aug. 31
Newcastle 3½ p.c. Deb.	89½—90½	+3

SUPPLEMENTARY LIST

Slough 5 p.c. Deb.	108—113	+8

OFFICIAL LIST

Alliance & Dublin Ord. (x.d.) ...	93—98	Sept. 7
Ditto 4 p.c. Deb.	100—105	+6
Associated Gas & Water 4½ p.c. Cum. Pref.	16/—18/-	+1/-
Brighton Cons. (x.d.)	72—77	Sept. 7
British Ord.	75—80	+3
Gas Light & Coke 3½ p.c. max. ...	52—57	+2
Ditto 3½ p.c. Red. Deb.	92—95	+2
Imperial Continental	64—69	+1
Portsmouth Cons.	93—98	+1
Severn Valley Gas Corporation Ord. (x.d.)	17/6—19/6	Sept. 7
Ditto 4½ p.c. Pref. (x.d.)	16/6—18/6	"
South Suburban 3½ p.c. Pref. ...	90—95	+3
United Kingdom Gas Corporation 4 p.c. 1st Pref.	16/—18/-	+-/6d.

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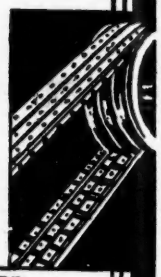

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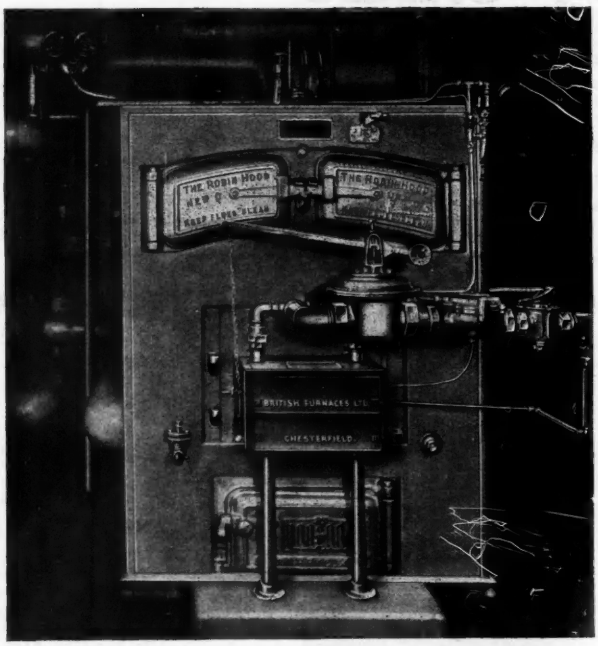

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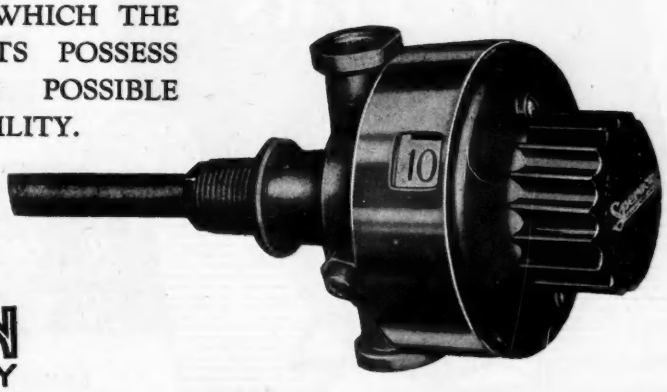

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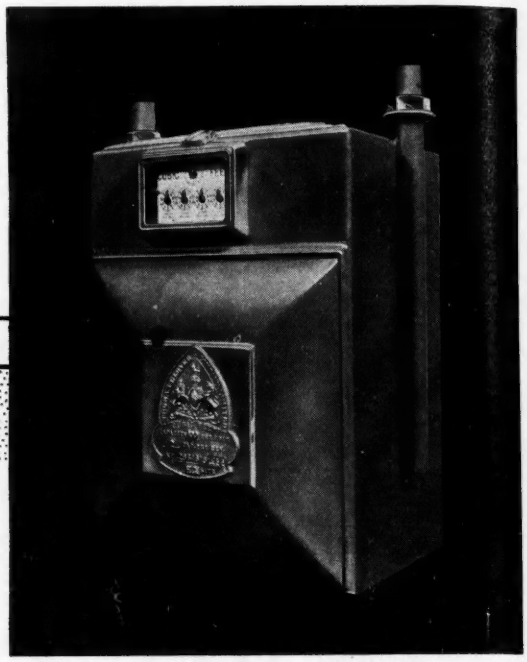

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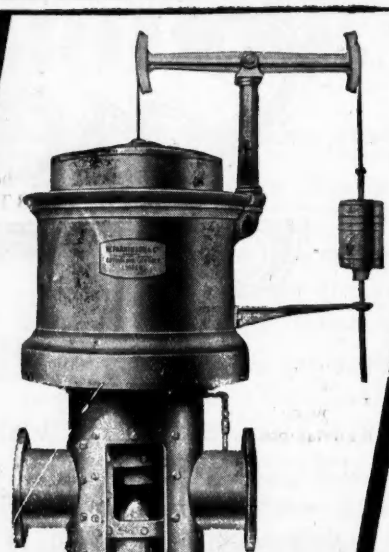

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